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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/805,216   | 03/14/2001  | Shinya Kobayashi     | HO4-3303/HO         | 8566             |
| 30743  | 7590        | 12/13/2004           | EXAMINER            |                  |
| WHITHAM, CURTIS & CHRISTOFFERSON, P.C.<br>11491 SUNSET HILLS ROAD<br>SUITE 340<br>RESTON, VA 20190 |             |                      | NGUYEN, LAM S       |                  |
|  |             | ART UNIT             | PAPER NUMBER        |                  |
|  |             |                      | 2853                |                  |

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                              |  |
|------------------------------|------------------------|------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b>          |  |
|                              | 09/805,216             | KOBAYASHI ET AL.<br><i>D</i> |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>              |  |
|                              | LAM S NGUYEN           | 2853                         |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 17 September 2004.

2a) This action is FINAL.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 2-8 and 10-15 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 2 and 12-15 is/are rejected.

7) Claim(s) 3-8, 10 and 11 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 17 March 2003 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 2, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (US 6046822) in view of Nakajima et al. (US 6025929).

#### **Referring to claim 15:**

Wen et al. discloses an image forming device comprising:

a head formed with a plurality of nozzles (*FIG. 1a, element 45*);  
a converting unit that converts recording data into driving data that defines driving pulses for corresponding ones of the plurality of nozzles (*column 1, line 66 to column 2, line 3 and FIG. 2-3, 5: The calibrator calibrates the input image file by converting the pixel values of the input image to waveform index number. As shown in FIG. 2, each waveform index number SN<sub>1</sub>-SN<sub>N</sub> represents characteristics of driving pulse for each nozzle TF<sub>IJ</sub>- TF<sub>NJ</sub> or TB<sub>IJ</sub>- TB<sub>NJ</sub>*);

an ejection element (*FIG. 1b, element 260*) provided to each one of the plurality of nozzles (*FIG. 1b, element 45*) for ejecting an ink droplet (*FIG. 1b, element 47*) from the corresponding nozzle onto the recording medium in response to the driving data; and  
a memory that stores nozzle profile data including waveform data and timing data

for each of the plurality of nozzles, the waveform data and the timing data indicating a waveform and a generating timing, respectively, of the driving data for each one of the plurality of nozzles

(*FIG. 2-3: a Look-Up-Table stores the waveform data A1, A2, W1, W2, and timing data S1-2, S2-3 corresponding to the jth nozzle. Column 4, lines 8-15: The delay times before start of pulses TFij and TBij also account for manufacturing variabilities between ink nozzles, such as different nozzle diameters and orientation. Please also see the RESPONSE TO ARGUMENTS for further explanation*), wherein

the converting unit converts the recording data into the driving data based on the nozzle profile data (*FIG. 1a-b: The controller 220 converts the recording data from ELECTRONIC MEMORY 20 into waveform data by associating nozzle data stored in LUT 60-63*), the driving data is a sequence of pulse data each corresponding to one of plurality of nozzles (*FIG. 2-4: The controller sequentially outputs waveform data to WAVEFORM GENERATOR 230 that generates a driving waveform to a nozzle selected by NOZZLE SELECTOR 240*) and each including a plurality of data sets (*FIG. 4: Each waveform data associating to an index waveform number includes at least 1<sup>st</sup> PULSE data and 2<sup>nd</sup> PULSE data*).

Wen et al. is silent about a feed unit that feeds a recording medium in a first direction and ink ejected onto the recording medium while the feed unit is feeding the recording medium in the first direction.

Nakajima et al. discloses an ink jet printhead having a recording head for ink discharge operation (*ink ejection*) and a sheet feed motor 152 (*feeder*), wherein the ink discharge operation is repeated in synchronization with the conveyance (*feeding*) or the print sheet conveyed by the feed motor 152 to form an image corresponding to one page of an image (*column 1, lines 52-58*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printing apparatus disclosed by Wen et al. to include a feeder that feeds the printing medium during the ink ejection operation as disclosed by Nakajima et al. The motivation for doing so is to be able to print the whole page of the printing medium as taught by Nakajima et al. (*column 1, lines 52-58*).

**Wen et al. also discloses the following claimed invention:**

**Referring to claim 2:** an updating unit that updates the waveform data for each of the plurality of nozzles when a printing condition has been changed (*column 5, line 38-56: a corresponding updating unit adjusts landing times and associated time delays according to the replacement variability*).

**Referring to claim 12:** a leveling unit that levels generating timings of the driving pulses by changing the timing data of the nozzle profile data (*column 5, lines 38-51: a corresponding leveling unit that levels generating timings in termed of “landing times” and associated “time delays” according to the replacement variability; Column 2, line 11-15: control timing of the waveforms to compensate for physical variabilities between nozzles*).

**Referring to claim 13:** a resolution changing unit that changes a time resolution, wherein each one of the plurality of data sets of the driving data having an original time resolution, and the resolution setting unit that sets the original time resolution of each of the data sets to a predetermined time resolution and wherein the original time resolution determines the waveform of each of the driving pulses, and the predetermined time resolution determines the generating timing of each of the driving pulses (*column 5, lines 38-49: a corresponding resolution changing*

*unit that changes a time resolution in termed of "landing times" and associated "time delays" according to the replacement variability).*

**Referring to claim 14:** wherein the original time resolution determines the waveform of each of the driving pulses and the predetermined time resolution determines the generating timing of each to driving pulses (*column 4, lines 13-24: Predetermined pulse width and time delays between pulses are selected according a desired mode*).

***Allowable Subject Matter***

2. Claims 3-8, 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Referring to claim 3:** The primary reasons for the indication of the allowability of the claim is the inclusions therein, in combination as currently claimed, of the limitation that first and second measuring units that measure first and second distances between the target impact position and an actual impact position on the recording medium where the ink droplet has impacted with respect to the first and second direction, and an updating unit that updates the nozzle profile data based on the target impact position, the first distance, and the second distance is neither disclosed nor taught by the cited prior art of record, alone or in combination.

Claims 4-8, 10-11 are allowable because they depend directly/indirectly on claim 3.

***Response to Arguments***

Applicant's arguments filed 09/17/2004 have been fully considered but they are not persuasive.

The applicants argued that each LUT 60-63 corresponds to a set of respective nozzles for each given color; thus, it can be understood that the LUT 60 shown in FIG. 2 is prepared for the plurality of nozzles for one color. Therefore, each of waveforms is for all of the plurality of nozzles but not for each one of the nozzles as claimed. The examiner does not agree with the arguments. The reason is that an adjusted waveform is generated not only based on color but also based on the location of a printed pixel (column 8, lines 1-5), wherein “*the pixel values respectively corresponding to a plurality of ink delivery nozzle 45*” (column 3, lines 34-35). Moreover, as stated in column 8, lines 5-10 that, “*selecting the correct nozzle 45 corresponding to that color and the pixel by sending signals to a nozzle selector 240 that is connected to waveform generator 230*”, wherein the waveform is generated so that “*ink droplets 47 are ejected from different nozzles 45 to arrive at a print line 110 in image area 120 starting at different times as determined by time delays before start of pulses TF<sub>ij</sub> and TB<sub>ij</sub> in LUT's 60-63*” (column 8, lines 32-36). In addition, as shown in FIG. 5, the physical variabilities of nozzles A-C cause the deviations in the ink drop placement location (column 5, lines 30-45). Thus, in order to correct the deviations, each corrected waveform having an adjusted ink droplet landing time and associated time delay is applied to a corresponding nozzle so that ink drops ejected from all nozzles land on the idea printing line 110 (column 5, lines 45-67). In conclusion, each adjusted waveform is applied to one nozzle.

The applicants also argued that Wen's disclosure is different from the claimed invention in which ink volume among the nozzles can be eliminated. However, this figure is not defined in the claims.

### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN  
November 26, 2004



HAI PHAM  
PRIMARY EXAMINER